



U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

# Advisory Circular

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**Subject:** SPECIFICATION FOR L-884,  
POWER AND CONTROL UNIT  
FOR LAND AND HOLD SHORT  
LIGHTING SYSTEMS

**Date:** 4/29/99  
**Initiated by:** AAS-200

**AC No.:** 150/5345-54  
**Change:**

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- 1. PURPOSE.** This advisory circular (AC) contains the Federal Aviation Administration (FAA) standards for power and control units for Land and Hold Short Lighting Systems.
  - 2. BACKGROUND.** FAA Order 7110.114, *Land and Hold Short Operations (LAHSO)*, provides operational requirements for lighting systems and other visual navigation aids required to conduct LAHSO.
  - 3. APPLICATION.** The standards contained herein are recommended by the FAA in all applications involving airport development of this nature. The use of these standards is mandatory for airport projects receiving Federal funds under the airport grant assistance program and the passenger facility charge (PFC) program.
  - 4. METRIC UNITS.** To promote an orderly transition to metric units, this AC includes both English and metric dimensions. The metric conversions may not be exact equivalents and, until there is an official changeover to the metric system, the English dimensions will govern.

David L. Bennett  
Director, Office of Airport Safety  
and Standards

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## FAA SPECIFICATION FOR L-884 POWER AND CONTROL UNIT FOR LAND AND HOLD SHORT LIGHTING SYSTEMS

### 1. SCOPE AND CLASSIFICATION.

**1.1 Scope.** This specification covers the requirements for the power and control units (PCU) for use in land and hold short lighting systems.

#### 1.2 Equipment Classification.

**1.2.1 Type.** Two types of systems are covered by this specification.

Type	Description
L-884H	Unit for LAHSO Hold Bar (steady burning lights)
L-884A	Unit for LAHSO Alert Bar (flashing lights)

**1.2.2 Style.** Two styles of systems are covered by this specification.

Style	Description
I	Indoor Unit
II	Outdoor Unit

**1.2.3 Ratings.** Standard ratings are as follows; however, other voltages, frequencies, or sizes may be used to suit local site conditions.

Standard Voltages (Volts in)	Standard Frequency (Hz)
120, 208, 240	60

**2. REFERENCED DOCUMENTS.** The following is a list of documents referenced in this AC.

#### 2.1 FAA Advisory Circulars.

AC 150/5300-13	<i>Airport Design Standards</i>
AC 150/5340-29	<i>Installation Details for Land and Hold Short Lighting Systems</i>
AC 150/5340-3	<i>Specification for L-821, Panels for Control of Airport Lighting</i>
AC 150/5345-46	<i>Specification for Runway and Taxiway Light Fixtures</i>
AC 150/5345-47	<i>Isolation Transformers for Airport Lighting Systems</i>
AC 150/5345-53	<i>Airport Lighting Equipment Certification Program</i>

#### 2.2 FAA Drawings.

FAA Drawing C-6046	<i>Frangible Coupling Type I and Type IA, Details</i>
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#### 2.3 FAA Standards.

FAA-STD-020	<i>Transient Protection, Grounding, Bonding and Shielding Requirements for Electronic Equipment</i>
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## 2.4 FAA Orders.

Order 7110.114	<i>Land and Hold Short Operations (LAHSO)</i>
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## 2.5 American National Standards Institute (ANSI) publications.

ANSI C57.12.00	<i>General Requirements for Distribution, Power, and Regulating Transformers</i>
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ANSI C57.12.90	<i>Test Code for Distribution, Power, and Regulating Transformers</i>
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ANSI C57.12.91	<i>Standard for Dry-Type Transformers</i>
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## 2.6 Military Standards.

MIL-STD-810E	<i>Environmental Test Methods</i>
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MIL-STD-461D	<i>Requirement for the control of Electromagnetic Interference Emissions of Susceptibility</i>
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MIL-STD-462D	<i>Electromagnetic Interference Characteristics, Measurement of</i>
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## 2.7 National Electrical Manufacturers Association (NEMA) Standards

NEMA 250-1985	<i>Enclosures for Electrical Equipment (1000 volts maximum)</i>
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**Notes:** Copies of FAA ACs may be obtained from the Department of Transportation, General Services Division, M-45, 400 7th Street SW., Washington, DC 20590. Telephone: (202) 267-3161/3115/8329. Some FAA ACs are available on the FAA Airports home page, [www.faa.gov/arp/arphome.htm](http://www.faa.gov/arp/arphome.htm).

Copies of ANSI publications may be obtained from the ANSI, 11 W. 42 Street, New York, NY 10036. Telephone: (212) 642-4900 and 764-3274.

Copies of Military Standards may be obtained from the Defense Printing Service, 700 Robins Avenue (Bldg. 4d), Philadelphia, PA 19111-5094, Attn: Customer Service. Telephone: (215) 697-2179 Fax: (215) 697-1460.

Copies of National Electrical Manufacturers Association (NEMA) Standards may be obtained from Global Engineering Documents (Global) and Information Handling at (800) 854-7179 (within the U.S.) (303) 397-7956 (international) (303) 397-2740 (fax) or at 15 Inverness Way East, Englewood, Colorado 80112-5776.

## 3. EQUIPMENT REQUIREMENTS.

**3.1 General Requirements.** Each L-884A power and control unit (PCU) shall be a power supply designed to power and simultaneously flash all lights in the LAHSO alert bar. A LAHSO alert bar is a row of six or seven in-pavement unidirectional flashing white lights installed in a runway to visually indicate to the pilot the alert point (1000 feet/ 300 meters prior to the hold point) during LAHSO. Each L-884H PCU shall be a power supply designed to power and provide the controls specified in this document for the lights in the LAHSO hold bar. A LAHSO hold bar is a row of six or seven in-pavement unidirectional steady burning white lights installed in a

runway to visually indicate to the pilot the hold point during LAHSO. The detailed installation criteria for a LAHSO hold bar is described in AC 150/5340-29, *Installation Details for Land and Hold Short Lighting Systems*.

### 3.2 Environmental Requirements.

**3.2.1 Style I, Indoor PCU.** Equipment intended for indoor installation shall be designed to operate properly under the following conditions:

- a. **Temperature.** Any ambient temperature from -40°F (-40°C) to 131°F (55°C).
- b. **Humidity.** Any relative humidity from 10% to 95%.
- c. **Altitude.** Any altitude from zero to 6,600 feet (2000 m).

**3.2.2 Style II, Outdoor PCU.** Equipment intended for outdoor installation shall be designed to operate properly under the following conditions:

- a. **Temperature.** Any ambient temperature from -67°F (-55°C) to 158°F (70°C).
- b. **Humidity.** Any relative humidity from 0% to 100% at an ambient temperature of 158°F (70°C).
- c. **Altitude.** Any altitude from zero to 6,600 feet (2000 m).
- d. **Sand and Dust.** Exposure to wind borne sand and dust particles.
- e. **Windblown Rain.** Exposure to windblown rain from any direction.
- f. **Wind.** Exposure to wind speeds up to 100 mph (161 km/hr) from any direction.
- g. **Salt-Spray.** Exposure to salt-laden atmosphere.
- h. **Sunshine.** Exposure to solar radiation.

### 3.3 Design Requirements.

**3.3.1 Enclosures.** All PCUs shall be housed in the proper NEMA style housing and shall provide suitable space for the installation of the communication interface(s) to provide the control requirement specified in paragraph 3.5 of this document. Each unit shall have a hinged access door with provisions for padlocking.

**3.3.1.1 Style I, Indoor PCU.** Style I, PCUs shall be housed in a stainless steel or aluminum NEMA Style 1 enclosure.

**3.3.1.2 Style II, Outdoor PCU.** Style II, PCUs shall be housed in a stainless steel or aluminum NEMA Style 4 or 4X enclosure. The total weight of each style II, PCU shall not exceed 100 lbs (46 kg). When style II, PCUs are installed in accordance with the manufacturer's instructions, the top of the unit shall not be higher than 42 inches (1070 mm) from the ground. PCU's designed for installation inside the runway and taxiway safety areas shall not be higher than 30 inches and not exceed 75 lbs and be installed with frangible couplings, which conform to FAA drawing C-6046. (Runway Safety Areas (RSA) and Taxiway Safety Areas (TSA) are defined in AC 150/5300-13, *Airport Design Standards*.) The frangible coupling and mounting flanges shall be designed for use with 2-inch (51 mm) electrical metallic tubing (EMT) and shall be suitable for mounting on a concrete pad. The point of frangibility shall be located no higher than 3-inches above grade when installed.

**3.3.1.3 Size.** Each unit with enclosure shall comply with the following maximum dimensions: width 24 inches (610 mm), height 36 inches (915 mm), and depth 9 inches (228 mm).

**3.3.1.4 Painting and Finishing.** The inside and outside of the PCU enclosure shall be given one prime coat and one finish coat of oil proof and weatherproof paint. The color of the finish coat for all PCUs shall be color No. 12197, Federal Standard 595. The outside painted surface of the enclosure shall be free of scratches, blemishes, and chipping. The outside painted surface shall withstand exposure to solar radiation.

**3.3.2 Control Cabinet.** The control circuits, relays, sensing devices, control terminal block, remote/local control switch or keypad, and other low voltage control components shall be protected from the elements of the specified environment. This protection may be provided by the main enclosure or an additional cabinet/compartiment installed inside the PCU. All low voltage control components shall be accessible by opening the housing (main enclosure, cabinet/compartiment) in which they are installed.

**3.3.3 Switch.** Each PCU shall have a local control switch and a input power switch, both located inside the enclosure. The switches shall have a contact rating of 125% of the load current and shall be rated to meet the circuit voltage requirements. The life expectancy of the all PCU switches, at rated load, shall be at least 25,000 operations. All switches installed with style II PCUs shall be designated for outdoor applications.

**3.3.3.1 PCU Local Control Switch (Output Power).** The local control switch shall energize and de-energize the output power from the unit. The switch shall be clearly and permanently marked to indicate the status of the PCU. The positions shall include "off", "remote", and each brightness step (i.e. step 3, etc.). When the switch is in the "off" position or set to any of the brightness steps, control signals shall not be accepted from the remote controls and the photocell. Therefore, the unit shall accept control signals from the remote control panel and the photocell only when the control switch is in the "remote" position.

**3.3.3.2 PCU Input Power Switch.** The input power switch shall be provided inside the PCU to de-energize input power to the unit for maintenance. When this switch is locked in the "off" position the input power to the unit shall be disabled and the unit shall be completely de-energized. The input power switch shall be clearly marked with a permanent marking to indicate when the PCU is "on"(energized) or "off"(de-energized).

**3.3.4 Components.** All PCU components shall be suitable for their function and shall not be operated in excess of the component manufacturer's recommended rating.

### **3.4 Electrical Requirements.**

**3.4.1 Input Voltage.** The PCU should be designed to operate from any standard utility single-phase alternating current service voltage less than 600 volts, and frequencies of 50 or 60 Hz. The standard voltages are 120 V, 208 V, or 240 V, and the standard frequency is 60 Hz AC.

### **3.4.2 Output Current.**

**3.4.2.1 Flash Rate [L-884A only].** The output current of the PCU shall continuously alternate between "on" and "off" to flash the LAHSO alert bar light units simultaneously. The "on" cycle duration shall be 1.35 seconds (+/- 0.1 seconds), and the "off" cycle duration shall be 0.8 seconds (+/- 0.1 seconds). The light units in the LAHSO alert bar shall flash simultaneously at all times, therefore the duration tolerance applies to the entire alert bar inclusive of all light units.

**3.4.2.2 Peak Current.** The PCU shall develop a peak output current (rms) during the "on" cycle within the limits of Table 1, while powering any load between no load (short circuit) and full (rated) load. Once the peak output current is reached, the current shall not fall below the allowable range until the beginning of the "off" cycle. The peak output current shall not exceed the applicable maximum output current in Table 1 stated tolerance. The LAHSO light bar circuits current during the "off" cycle shall be one ampere, (-0, +0.5 amperes).

**Table 1. PCU Peak Output Current (Amperes rms).**

Step	Nominal Output	Allowable Range
5	6.6	6.40 - 6.70
4	5.2	5.04 - 5.36
3	4.1	3.98 - 4.22
2	Not Used	--
1	Not Used	--

**3.4.2.3 Output Current Surge Limitation.** Switching the PCU “on” and “off”, changing brightness steps, or shorting the load shall not produce output surges that cause damage to series incandescent lamps. If time delay is utilized, the time delay between the PCU being switched “on” to the delivery of current to the LAHSO light bar circuits shall not be more than 2 seconds.

**3.4.3 Loss of Power.** In the event of a loss of input power, the PCU shall resume normal operation within 5 seconds after the restoration of input power.

**3.4.4 Transient Suppression.** For solid state equipment, transient suppression shall be provided in accordance with FAA-STD-020, Paragraph 3. The transient suppression devices shall be capable of withstanding lightning transients consisting of a 10-by-20 microsecond current surge of 15,000 amperes with the subsequent power-follow current and a voltage surge of 10 kV/microsecond. The system shall also withstand without damage the repeated application of an over voltage transient on the input power lines equal to 500 volts peak for a duration of 50 milliseconds.

**3.4.5 Lightning Arresters.** Lightning arresters shall be provided with each PCU. The lightning arresters shall be sized to protect the unit and installed should be connected from each output terminal to ground. The ground side of the arresters shall be connected to the grounding lug of the enclosure or other suitable location. The lightning arresters shall be able to withstand without damage the repeated application of an over voltage transient on the input power lines equal to 500 volts peak for a duration of 50 milliseconds.

**3.4.6 Electromagnetic Interference.** The PCU shall cause minimal radiated or conducted electromagnetic interference to other equipment such as computers, radars, instrument landing systems, radio receivers, very high frequency omnidirectional radio ranges, global positioning system units, etc., that may be located on or near an airport, or uses the same power supply. Any electromagnetic interference that degrades, obstructs, or repeatedly interrupts the desired performance of electronic equipment in the airport environment is unacceptable. Each PCU shall meet the requirements in MIL-STD-461, CE101, applying the limit in Figure CE101-4 and CE102, applying the limits in Figure CE102-1. Each PCU shall also meet the requirements in FAA-STD-020.

**3.4.7 Terminal Block.** Pressure-style terminal blocks having a suitable voltage rating shall be installed in the control cabinet for connection of the external wiring associated with monitoring and remote control. Terminal blocks shall accommodate No. 12 to No. 20 AWG wire with insulation rating up to 600 V. Two spare positions shall be provided. Each individual terminal shall be identified with permanent markings that match the identities in the wiring diagram furnished with the unit.

### **3.5 Control Requirements.**

**3.5.1 General Requirement.** The PCU shall have provisions to control the appropriate operational functions locally and/or remotely. The local control shall be located on the PCU. A remote control panel shall be located in the airport traffic control tower (ATCT). All control panels shall comply with AC 150/5345-3, *Specification for L-821, Panels for Control of Airport Lighting*.

**3.5.2 Intensity (Brightness) Control.** The PCU regulates the intensity of the LAHSO light bars. If the PCU is under remote control, the intensity is set automatically. The PCU receives input control signals from the photocell



and the sensor detecting the intensity/current (step) of the runway edge lights installed on the same runway as the LAHSO light bars. The photocell control signal shall detect whether day mode or night mode conditions exist and shall cause the PCU to automatically set the LAHSO light bars to the appropriate intensity setting. In day mode the system intensity shall be step 5 (6.6 A). In night mode the intensity selection is dependent on the intensity setting of the runway edge lights and shall be in accordance with Table 2. If the PCU is under local control, meaning intensity steps are selected with the PCU control switch (local control), then the manually (local control) selected intensity setting shall override all automatic intensity control.

**3.5.3 Photoelectric Control.** The photocell shall be installed facing the northerly direction. The PCU shall automatically set the intensity to the specified day mode setting when the illumination on the photocell rises to 55 (+/- 5) footcandles, and to night mode settings when the illumination drops to 30 (+/-5) footcandles. An intensity setting transition time delay of 45 to 75 seconds shall be incorporated into the unit to prevent the unit from switching due to stray light or temporary shadows. The photocell shall be an integral part of style II PCUs. The photocell mounting system shall allow the photocell to be turned around 360° in azimuth and shall have locking provisions to keep it from moving out of position under the wind loads stated in Paragraph 3.2.2. For style I PCU's, a photocell may be provided for each unit or one photocell may be provide which provide the specified communications with both the L-884A and the L-884H associated with the two LAHSO bars for a particular hold point. The purchaser is responsible for installing the photocell remotely in accordance with the PCU manufacturer's instructions. In the event of the failure of the photoelectric control circuit, the PCU shall revert to the highest intensity step: step 5 (6.6 A). Photoelectric circuit failure is defined as a non-communication or miscommunication of information, ie. The photocell identifies day mode with it is actually night mode conditions and vice versa.

**Table 2. LAHSO Light Bar Intensity Steps (amperes).**

<b>MIRL/HIRL Light Intensity</b>	<b>Day Mode</b>		<b>Night Mode</b>	
	<b>LAHSO Light Bars with MIRL's</b>	<b>LAHSO Light Bars with HIRL's</b>	<b>LAHSO Light Bars with MIRL's</b>	<b>LAHSO Light Bars with HIRL's</b>
5	--	5 (6.6 A)	--	5 (6.6 A)
4	--	5 (6.6 A)	--	5 (6.6 A)
3	5 (6.6 A)	5 (6.6 A)	4 (5.2 A)	4 (5.2 A)
2	5 (6.6 A)	5 (6.6 A)	3 (4.1 A)	3 (4.1 A)
1	5 (6.6 A)	5 (6.6 A)	3 (4.1 A)	3 (4.1 A)
Off	5 (6.6 A)	5 (6.6 A)	3 (4.1 A)	3 (4.1 A)

**Note:** The above intensity selections are based on the intensity selections of the runway edge lighting systems installed on the same runway as the LAHSO light bars. (Runway edge lighting systems are described in AC 150/5340-24.) High intensity runway lights (HIRL) circuits are installed with 5-step constant current regulators. Similarly, medium intensity runway lights (MIRL) circuits are installed with 3-step regulators.

**3.5.4 Monitoring.** The PCU shall have monitoring capabilities internal to the unit. The monitor shall detect the status of the PCU ("on", "off", etc.), LAHSO light bar circuits (lights on, lights off, current intensity step, etc.), and each light unit (on or not on when required to be on or off) in the system. The monitor shall operate at all lighting intensity steps and when the PCU is controlled remotely or locally. The monitor outputs shall be connected to a terminal block to facilitate external connections, and shall operate properly while connected to a circuit with a minimum round-trip length of 20,000 feet (3,000 m) using No. 19 AWG wire. The voltage for the monitor external output shall not exceed 120 V. An RS-232 monitor output port may be provided at the request of the purchaser, in addition to the terminal block. If one of the PCU's controlling associated LASHO light bars fails, both LASHO light bars shall be de-energized and a signal indicating system failure shall be provide to the control tower. When the system is initially energized if one PCU is energized before the other, the system shall not fail. A visual indication shall be provided on the monitor to indicate which fault has occurred (except for fault (i)). A

PCU-on indicator light shall be provided on each unit to indicate when the unit is energized. If any of the system faults described below occur, a fault light shall be displayed, for the affected LAHSO light bars, on the LAHSO control panel in the ATCT. Upon initial detection of a fault the monitor shall delay the specified amount of time before indicating the fault. The fault and time delay requirements are as follows:

- i) Loss of input power to the PCU. (0 seconds)
- ii) Shutdown of the PCU due to operation of any protective circuits. (0 seconds)
- iii) A failure of the PCU to pulse the light fixtures. (5 seconds)
- iv) A failure of two or more lamps in any one light bar. (5 seconds)

### 3.6 General Requirements.

**3.6.1 Wiring Diagram.** A legible wiring diagram shall be permanently mounted in an unobstructed place in the control cabinet. The wiring diagram shall be protected from dirt, dust, and moisture. (i.e. place in a protective sheet cover.)

**3.6.2 Warning Label.** A plate or decal shall be affixed to the front of the control cabinet door warning maintenance personnel to remove input and control power before opening the cabinet.

**3.6.3 Nameplate.** A nameplate with the information below shall be securely attached to the front of the PCU enclosure. If the nameplate is attached to a readily removable surface, such as a cover, the serial number shall be duplicated in a permanent conspicuous place elsewhere on the PCU.

- (1) Land and hold short light power and control unit, single phase.
- (2) Input: \_\_\_\_\_ Volts \_\_\_\_\_ Hertz \_\_\_\_\_ Amperes.
- (3) Control: \_\_\_\_\_ Volts \_\_\_\_\_ Hertz.
- (4) Output: \_\_\_\_\_ kW at \_\_\_\_\_ Amperes.
- (5) Output Current: \_\_\_\_/\_\_\_\_/\_\_\_\_ Amperes.
- (6) Identification: FAA-L-884 \_\_\_\_\_ Serial No.

**3.6.4 Instruction Book.** An instruction book containing at least the following information shall be furnished with each PCU:

- (1) Complete schematic and wiring diagrams showing all components cross-indexed to the parts list.
- (2) Complete parts list with applicable rating and characteristics of each part and with the component manufacturer's name and part number.
- (3) Installation instructions.
- (4) Maintenance instructions.
- (5) Troubleshooting charts.

(6) Theory of operation.

(7) Software User's Manual. (If software is used in the system design.)

#### 4. EQUIPMENT QUALIFICATION PROCEDURES.

**4.1 Qualification Procedures.** Procedures for qualifying equipment to be furnished under the Federal grant assistance program for airports are contained in AC 150/5345-53, *Airport Lighting Equipment Certification Program*.

**4.2 Qualification Tests.** The following tests shall be performed on each unit submitted for qualification, to demonstrate compliance with the specification.

**4.2.1 Visual Examination.** The equipment shall be examined for compliance with the requirements on size, weight, materials, finish, and quality of workmanship.

**4.2.2 High Temperature Test.** A high temperature test shall be conducted in accordance with MIL-STD-810E, Method 501.3, Procedure II. The equipment shall be subjected to a stable temperature of +131 °F (55 °C), +/- 5°F (style I), +158°F (70 °C), +/- 5 °F (style II), for a period of 4 hours after temperature stabilization. The test unit shall be operated throughout this test and perform all specified functions. Any deterioration in materials or performance will be cause for test failure and cause the equipment to be rejected.

**4.2.3 Low Temperature Test.** A low temperature test shall be conducted in accordance with MIL-STD-810E, Method 502.3, Procedure II. Style I PCUs shall be subjected to a 24 hour soak at -40°F (40 °C), +/-5°F. Style II PCUs shall be subjected to a 24 hour soak at -67°F (-55 °C), +/-5°F. The test unit shall be operated on the first and last cycles of this test and perform all specified functions. Any deterioration in materials or performance will be cause for test failure and cause the equipment to be rejected.

**4.2.4 Humidity Test.** Subject all PCUs to a humidity test in accordance with MIL-STD-810E, Method 507.3, Procedure I. The equipment shall be subjected to three cycles (72 hours) according to Table 507.3-I, except the maximum temperature at cycle 1 shall be +131 °F (+55 °C), +/-5 °F+158°F (70 °C), +/- 5 °F (style II). The test unit shall be operated throughout this test and perform all specified functions. Any deterioration in materials or performance will be cause for test failure and cause the equipment to be rejected.

**4.2.5 Low Pressure (Altitude).** Each PCU shall be tested for low pressure (altitude) according to MIL-STD-810E, Method 500.2, Procedure II. The maximum altitude shall be 6,600 feet (2,000 m) and the ambient temperature shall be +131 °F (+55 °C), +/-5 °F, +158°F (70 °C), +/- 5 °F (style II). The PCU shall be operated at rated voltage, load, and maximum brightness for 4-hours. Failure of the input voltage test immediately after the 4-hour cycle shall be cause for rejection.

**4.2.6 Sand and Dust Test. [Applies to Style II PCUs only]** A sand and dust test shall be conducted in accordance with MIL-STD-810E, Method 510.1, Procedure I. Rotate the equipment 120 degrees twice during the test. The air velocity shall be 2,500 +/- 500 feet per minute (760 +/- 150 meters per minute).

**4.2.7 Rain Test. [Applies to Style II PCUs only]** A wind-blown rain test shall be conducted in accordance with MIL-STD-810E, Method 506.3, Procedure I, with a rain rate of 5.2 inches/hr (13 cm/hr). The test duration shall be 30 minutes per side. Any deterioration of system performance or excessive accumulation of water in the PCU enclosure shall be cause for rejections.

**4.2.8 Wind Test. [Applies to Style II PCUs only]** The test unit shall be mounted to one or more 2-inch (51 mm) EMT conduit and subjected to a 100 MPH wind which shall be applied from all directions. Any physical distress,

damage, or deterioration to any part of the test unit's assembly or alteration of the units performance will be cause for test failure and cause the equipment to be rejected.

**4.2.9 Salt-Fog Test. [Applies to Style II PCUs only]** A salt-fog test shall be conducted in accordance with MIL-STD-810E, Method 509.3, Procedure I. The test duration shall be 48 hours exposure and 48 hours drying. Any evidence of damage, rust, pitting, or corrosion (except to sacrificial coatings) shall be cause for rejection .

**4.2.10 Solar Radiation (sunshine) Test. [Applies to Style II PCUs with non metallic external parts only]** A sunshine test shall be conducted in accordance with MIL-STD-810 E, Method 505.2, Procedure II. The material shall be subjected to a minimum of 6 cycles. The test unit shall operate and perform all specified functions after this test. Any evidence of deterioration or alteration of the test unit's performance shall be cause for rejection.

**4.2.11 NEMA Standard Verification.** The test unit shall be verified after assembly for compliance with specified NEMA standards.

**4.2.12 Frangibility Test. [Applies to Style II PCUs only]** The manufacturer shall demonstrate that the frangibility of the mounted unit is equivalent to that of a 2-inch (51mm) frangible coupling depicted in FAA drawing C-6046.

**4.2.13 Dielectric Test.** The test unit shall be subjected to a minimum of 2000 V (input circuit lines to ground), 1,000 V (control circuit lines to ground), and 2,000 V (output lines to ground) at 60 Hz RMS for one minute without failure. The minimum insulation resistance for this test shall be 50 megohms. Components of the test unit not designed to meet the requirements of this test, such as lightning arresters, shall be disconnected for the dielectric test.

**4.2.14 Transient Suppression Test.** For PCUs containing solid-state components, the power input lines shall be tested for resistance to the lightning transient in accordance with MIL-STD-462D, Method CS06, including Notices 1, 2, and 3. The system shall be tested for resistance to the over voltage transient given in Paragraph 3.4.4. After the transients have been applied to the system, it shall continue to supply specified output currents at all intensity settings.

**4.2.15 Electromagnetic Interference Test.** The test unit shall be tested to verify conformance with the interference requirements in paragraph 3.4.6. Conducted interference levels on the power leads, control leads, and signal leads, shall not exceed the limits for CE101, Figure CE101-4, and CE02, Figure CE102-1. Test in accordance with the test methods defined in MIL-STD-462D.

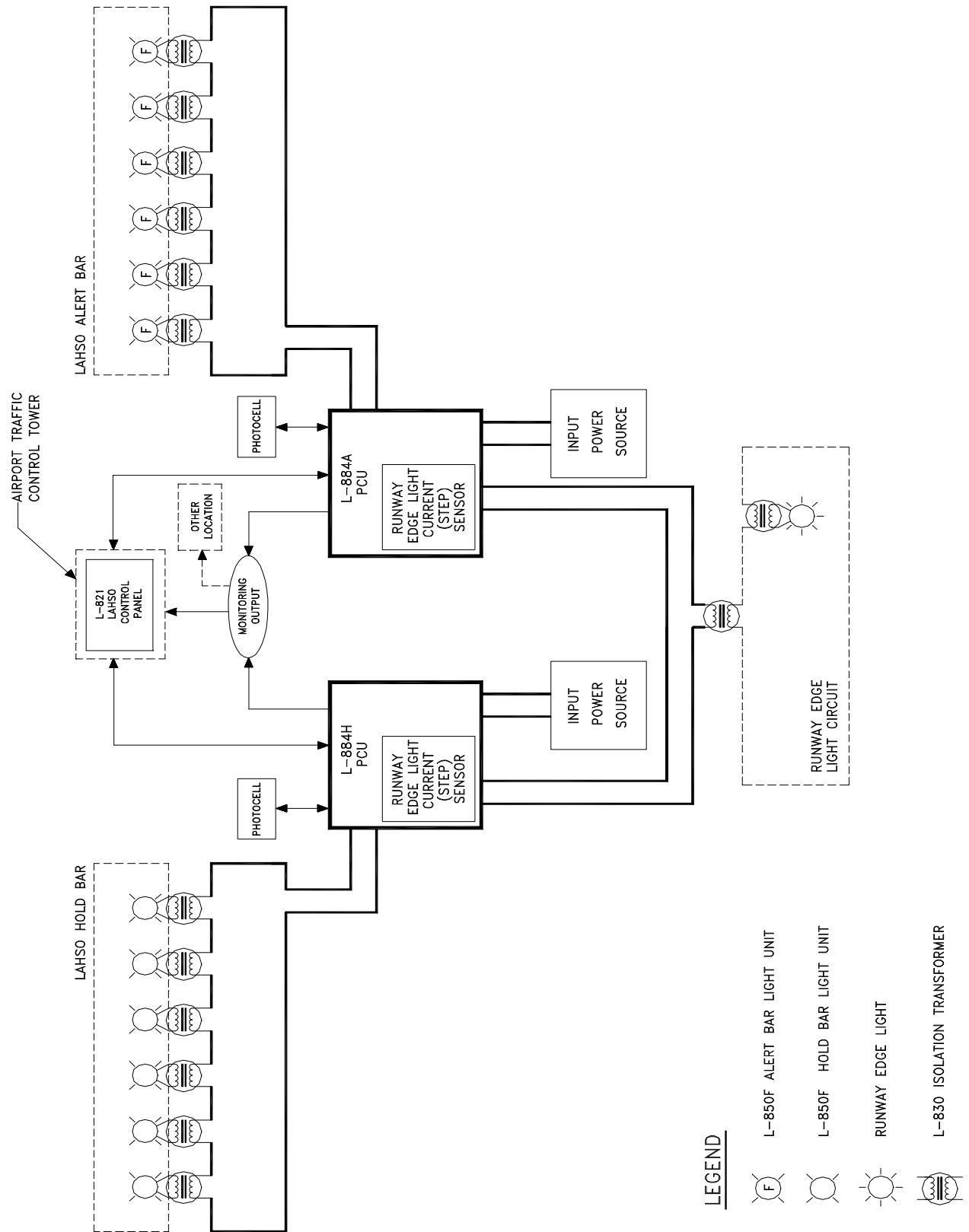
**4.2.16 Operational Test.** An operational test shall be performed to demonstrate compliance with all operating requirements specified in this AC.

## **5. PRODUCTION TEST REQUIREMENTS.**

**5.1 Production Tests.** The following tests shall be conducted on each PCU.

**5.1.1 Visual Examination.** The equipment shall be examined for compliance with the requirements on materials, finish, and quality of workmanship.

**5.1.2 Operational Test.** An operational test shall be performed to demonstrate compliance with all operating requirements specified in this AC.



**Figure 1. LAHSO Lighting System Block Diagram.**

**APPENDIX I. Terms.**

- A. Land and Hold Short Operations (LAHSO)** – Air Traffic Control Operations that include landing and holding short of an intersection runway, a taxiway, a predetermined point, or an approach/departure flight path.
- B. LAHSO Alert Bar** – A row of six or seven in-pavement unidirectional flashing white lights installed in a runway to visually indicate to the pilot the alert point (1000 feet/300 meters prior to the hold point) during LAHSO.
- C. LAHSO Hold Bar** – A row of six or seven in-pavement unidirectional steady burning white lights installed in a runway to visually indicated to the pilot the hold point during LAHSO.
- D. Light Unit** – A single light assembly including the fixture, filter, bulb, etc.